Math 111, Intro to Mathematical Methods **04 March 2004**
Exam 1 **Crawford**
Name: _____

- No books or notes allowed. Calculators are allowed on Part B only.
- Clearly indicate your answers.
- ***Show all your work*** – partial credit may be given for written work.
- Good Luck!

The following formulas may or may not be useful:

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

	Score
1	/3
2	/3
3	/24
4	/12
5	/4
6	/2
7	/5
8	/12
9	/20
10	/20
Total	/100

Part A You must completely finish Part A and turn it in before you may use a calculator on Part B. Show all work in a *neat and organized* fashion. Clearly indicate your answers.

1. (3 pts). Given the number -4.5, circle all of the following that describe the number.

real irrational rational natural integer

2. (3 pts). Sketch the graph represented by the following inequalities.

$x \leq 4$ and $x > 0$

3. (24 pts). Simplify the following. Reduce fractions when possible.

(a). $-3.2 + 7.2$

(b). $\dfrac{4 \cdot (-3)}{(-2) \cdot (-9)}$

(c). $\dfrac{2 - 4 \cdot 2 + 3}{-2^4 - 4}$

(d). $\dfrac{1}{3} - \left|\dfrac{1}{3} - \dfrac{1}{2}\right|$

(e). $\dfrac{2xy}{z} \div \dfrac{6x}{9z}$

(f). $25^{1/2}$

(g). $\dfrac{4^{-2} \cdot 4^5}{4^{-3} \cdot 4}$

(h). Remove parentheses and simplify.

$a - [1 + 3x + (a - x)]$

4. (12 pts). Simplify the following. Unless instructed otherwise, use only positive exponents (i.e. no radicals, no negative exponents).

(a). $\dfrac{a^3}{a^{-5}}$

(b). $\left(\dfrac{x^3y^{-2}}{y^4}\right)^{-2}$

(c). $\dfrac{4x^{1/2}}{2x^{5/2}y^{-1/2}}$

5. (4 pts). Rewrite the following in exponential form and simplify.

$a\sqrt[3]{a}$

6. (2 pts). Write the following in radical form. Do not simplify.

$3x^{5/2}$

Part B You must completely finish Part A and turn it in before you may use a calculator on Part B. Show all work in a *neat and organized* fashion. Clearly indicate your answers.

7. (5 pts). Simplify and leave your answer in radical form.

$$\frac{\sqrt{32x^5y^4}}{\sqrt{2xy}}$$

8. (12 pts). Perform the indicated operations and simplify.

(a). $(4-6x)(2+3x)$

(b). $(x-y+1)(2x-y)$

(c). $(8x^2-4xy^2+8x) \div (4xy)$

9. (20 pts). Factor *completely*.

(a). $3xy^2 - 9xy - 2y + 6$ [Factor by grouping]

(b). $a^3 - 27$

(c). $x^2 + x - 6$

(d). $2x^2 + 5x - 12$

(e). $x^3 - 4x$

BONUS: Multiply and simplify each of your answers in # 9 . Then based on ***that*** result, answer whether you factored correctly or not.

Multiply & Simplify	Did you factor correctly?
	yes no
	yes no
	yes no
	yes no
	yes no

10. (20 pts). Perform the indicated operations and simplify.

(a). $\dfrac{1}{4} - \dfrac{2a-3}{3}$

(b). $\dfrac{x^2-4}{x^2+x-1} \cdot \dfrac{x^2+2x-3}{x^2+x-6}$

(c). $(x^2-x-12) \div \dfrac{x^2+2x-3}{1-x^2}$

(d). $\dfrac{3}{x^2+2x+1} - \dfrac{x}{x^2-1} + \dfrac{1}{x-1}$